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Premenstrual Tension, Expectancy, and Mother-Child Relations

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The role of expectancy in enhancing or mitigating premenstrual symptoms was examined in 51 mothers of preschoolers. Expectancy was manipulated by providing information either in support of a biological cause for genuine universal mood changes or in support of a psychological cause arising out of negative societal myths. A third group was given no information. Mood, cognitive function, and mother-child interaction were assessed both at mid-cycle and premenstrually, and the results suggested that expectancy enhances symptoms. The Psychological group lowered their symptom expectations and reported less negative mood premenstrually as well as fewer symptoms at the end of the test month. The other groups reported no change in symptoms and greater premenstrual negative mood than the Psychological group. All groups demonstrated greater task persistence and more positive mother-child interaction during the premenstrual phase.

KEY WORDS: premenstrual tension; mother-child interaction; cognition; expectancy manipulation.

INTRODUCTION

Recent years have seen considerable interest in the cognitive, affective, and behavioral changes associated with the premenstrual phase of the menstrual cycle. Although there is evidence pointing to changes in arousal

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level (Asso, 1978; Friedman and Meares, 1979; Wineman, 1971), metabolic rate (Smolensky, 1980), endocrine function (Bell, 1975; Messent, 1976), and many other physical processes associated with the menstrual cycle, the evidence for corresponding cyclic changes in mood and behavior remain somewhat contradictory. Methodological difficulties contribute in large part to the discrepancies. For example, Sommer (1980) concluded that the contradictions found in menstrual cycle research point to the inherent variability of the effect, namely, that women vary in degree and type of menstrual distress and that therefore research aimed at demonstrating the universality of the effect is unprofitable. It would be more productive to preselect women depending on the research question being posed and to avoid generalizing across subgroups. In addition, third-person mood ratings and behavioral observations should be included to avoid the biases inherent in self-report.

Despite these inconsistencies and methodological problems, Dennerstein and Burrows (1979) reviewed 24 menstrual studies and cautiously concluded that most found some premenstrual increase in self-reported negative affect. Suicidal and criminal tendencies have also been reported to increase in the premenstrum (Ellis and Austin, 1971; Tonks *et al.*, 1968; Wetzel & McClure, 1972) but the generality of these finding to normal women has been questioned (Parlee, 1973). Bardwick (1974) found women more competitive, assertive, and self-confindent in their game-playing style at midcycle than during the premenstrum. Herlihy (1977) rated a small sample of preschool teachers on 13 behavior categories and found that only physical affection varied systematically, being highest at the late follicular phase and again premenstrually. Punitive behavior showed no phase effect. Other studies, however, did find a premenstrual increase in the verbal aggressivity level of school teachers (Teitler, 1979) and in the willingness of subjects to administer shocks to a "stupid" learner (Schonberg *et al.*, 1976). These findings of fluctuations in affection and aggression displayed toward children raise the question of possible menstrual cycle effects on mother–child interaction.

Traditional etiological theories of premenstrual symptoms have espoused a biological (Dalton, 1977; Reid and Yen, 1981) or psychiatric (Benedek, 1973; Shader and Ohly, 1970) cause. Recently, the importance of cognitive and social conditioning factors has become a prime focus (Paige, 1972; Koeske and Koeske, 1975; Ruble and Brooks-Gunn, 1979; Weideger, 1976).

In an attempt to incorporate both cognitive and biological factors, recent models have proposed an interaction between cognitive expectancies and elevated physiological arousal in the premenstrum. Two models of interaction have been proposed. The synergistic model (Asso, 1978) postulates that increased arousal primes the woman for more intense emotional experience, both positive and negative, but that negative expectancies based on cultural stereotypes and past experience lead the arousal to be labeled and experienced as a negative emotion and may even further increase the physiological

arousal. This model predicts that the greater the expectancy of negative mood, the greater the experience of it.

The stress-reduction model (Rodin, 1976) proposes that if a state of physiological arousal conforms to expectations, then the emotional component and deleterious effect of that arousal is reduced. Rather than heightening negative affect, expectancy mitigates it. Rodin (1976) demonstrated that menstruating women who could reattribute their task arousal to their menstrual state performed better on cognitive tasks than women who could not reattribute. She explained her findings with reference to attributional research, which has demonstrated that when a physiological state is attributed to a normal, predictable, or expected source, emotionality is reduced, whereas when the physiological state contradicts expectations, emotionality is increased (Nisbett and Valins, 1971).

The purpose of the present study was twofold: (1) to determine the relative predictive accuracy of the synergistic and stress-reduction models of expectancy–arousal interaction and (2) to examine the possibility of cycle-related change in positive and negative maternal behavior. The synergistic model predicts that subjects whose expectancy is raised will experience more symptoms, while subjects with lowered expectancy will experience fewer symptoms. The stress-reduction model predicts the reverse. It was also predicted that both positive and negative maternal behavior would increase in the premenstrum, in accordance with previous research on aggressive and affectionate behavior (Herlihy, 1977; Schonberg, 1976; Teitler, 1979).

METHOD

Subjects

Ss were 51 normal married mothers from the general Ottawa population, between 25 and 40 years old, reporting normal regular menstrual cycles and free of mood-altering, migraine, hormone, or birth-control medication. They had at least one healthy, normal child between 2 and 4 years of age and they complained of at least moderate premenstrual negative affect. Participation was voluntary and unpaid, and subjects were recruited through newspaper ads and through questionnaires distributed to local nursery schools.

Measures

(1) The Response-Class Matrix (Mash *et al.*, 1973; 1979) was used to score the mother–child interaction in the laboratory. Five dependent measures

were calculated from the matrix for the present study: (a) Mother's Negative Behavior; (b) Mother's Positive Interactions—the percentage of behaviors which comprised praise, question, and positive interaction; (c) Child's Negative Behavior; (d) Child's Interaction; and (e) Mother's Positive vs. Negative Control of Child's Negative Behavior.

(2) The Conners Parent-Teacher Questionnaire (PTQ; Conners, 1973) was modified for use by both the mother and the father to rate the child's perceived troublesomeness. This was included to assess variations in perception of their child's troublesomeness across the menstrual cycle.

(3) The Moos Menstrual Distress Questionnaire (MDQ; Moos, 1968) was used by the Ss to rate (a) the symptoms they usually experienced, to obtain a baseline measure; (b) the symptoms they expected to experience after being exposed to the expectancy manipulation; and (c) the symptoms they actually experienced in the test month. Only the Negative Affect and Concentration scales of the MDQ were used in the calculations because only affect and concentration were being targeted in the experimental manipulation. MDQ scores were obtained by subtracting the intermenstrual from the premenstrual scores to obtain a measure of change across the cycle. Added to the standard MDQ where two questions measuring Ss' beliefs as to the main causes of their symptoms: hormones, water retention, worry and dislike of period, and other psychological factors. These questions were rated on a four-point scale.

(4) The Profile of Mood States (POMS; McNair *et al.*, 1971) was filled out by each woman and her husband to rate her moods on the test day. Because correlations between the six POMS mood scores were quite high, they were combined as suggested by the authors to yield a Total Mood Disturbance Score (TMDS). Self-rated and husband-rated TMDSs were calculated independently. The Anger–Hostility scale score was also analyzed as a separate score because of its possible relationship to aggression.

(5) Five-letter anagrams (Tresselt and Mayzner, 1966) and pairs of line puzzles (Glass and Singer, 1971) provided measures of cognitive functioning and stress tolerance during the 17-min laboratory observation of the mother and child. The first line puzzle was insoluble, while the second in the pair was soluble. Two sets of anagrams and two pairs of line puzzles were used in a counter balanced order across subjects and experimental conditions.

Experimental Manipulation

The Ss were divided into three groups: Biological, Psychological, and Control. The first two groups were provided with information about the etiology of premenstrual tension, while the control group received no information. The information comprised three parts: (1) reading a bona fide jour-

nal article related to premenstrual tension; (2) viewing a 20-min videotape of a prominent Ottawa gynecologist[3] discussing premenstrual tension (this videotape was scripted by the experimenter and acted out by the doctor, who was a cohort in the study); and (3) taking part in a 40-min discussion group led by the experimenter dealing with the tape and the article.

In the Biological group, the information strongly endorsed a physiological etiology for universal, unavoidable fluctuations in mood and concentration. Detailed information on hormonal and chemical changes was given, with the intent of enhancing symptom expectations.

The Psychological group was told that premenstrual tension was due not to biology but to negative societal myths. The information indicated that self-fulfilling expectations, cognitive bias, misattribution, and the negative labeling of ambiguous physiological arousal combine to create an illusion of premenstrual tension without a biological basis. This information was designed to lower symptom expectancy. The results of a preliminary pilot study had revealed that both manipulations altered expectations in the desired direction, although the Biological manipulation did not reach statistical significance.

Equipment and Setting

The testing room was a white 9 × 11-ft carpeted room with a table and chair provided for the mother in the corner and an assortment of toys for the child, including a noisy drum and flute, blocks, a rickety easel and paint, and a very attractive furnished doll's house which the child was not allowed to touch. The puzzles and anagrams were placed on the table with a kitchen timer which had a loud tick. On a tripod in the opposite corner was a video camera connected through a hole in the wall to a video recorder and receiver in the adjacent observation room.

Procedure

Volunteers were screened for eligibility and the initial MDQs were mailed to them. Subject selection was based on a minimum difference score of 6 on the combined Negative Affect and Concentration scales. Ss were then assigned to one of the three groups in an attempt to match the groups for age, initial MDQ score, and age and sex of child. During a home visit subjects were given the journal article to read. In addition, the MMPI was utilized

[3]The author is indepted to Dr. Norman Barwing for his assistance in this matter.

to rule out any Ss with gross personality disturbances. Finally, subjects were instructed on how to record their basal body temperature (BBT) and they were told that the study was examining moods and mental ability across the menstrual cycle in mothers with small children at home because of the special frustrations of motherhood.

Experimental subjects were gathered together in groups of five to eight and subjected to the information manipulation as described above. A second MDQ concerning the symptoms they expected to feel in the month to come was administered following this to assess the change in expectancy. Control subjects were given this second MDQ during the home visit. Subjects were cautioned not to discuss their moods or menstrual status with their husband in order to minimize contamination of his POMS ratings.

Mothers were then seen with their preschool child twice in the next month, once about 3 days before ovulation and once about 2 days before menstruation. The order of testing was balanced across subjects in each group. Menstrual status was predicted by BBT, usual cycle length, and date of last period. For this reason, subjects could not be naive as to the timing of the visits. Subjects were seated in the lab, instructed to spend 10 min on the anagrams and 7 min on the two puzzles combined, and told that their child could play with everything but the doll's house, which was fragile. The study was explained as an examination of mental ability under stress, with the child being the stressor to approximate real life. The experimenter then left the room and the mother–child interaction was videotaped for later scoring by two trained student raters who were blind as to the subjects' experimental condition. After the observation period, subjects were given two copies of the POMS and PTQ to be filled out by themselves and their husbands that evening without consultation. Ratings covered the preceding 24 hr. Following the second assessment, which was identical in procedure to the first, subjects were given a final MDQ to be filled out in a few days' time, rating the symptoms they actually experienced in the test month. Upon the experimenter's receipt of the final questionnaires, subjects were debriefed and given a brief explanation of the real purpose of the experiment. Once the results were analyzed, all subjects were provided with a written summary of the study's findings.

RESULTS

Preliminary one-way analyses of variance (ANOVA) were performed on all background variables, MMPI scale scores, initial MDQ scores, and midcycle dependent measures. No significant differences were found between the groups. For the whole sample, the average ages of the mothers and their children were 32.4 and 3.4 years, respectively. The average family income was comparable to that of the metropolitan Ottawa area [$29,000 (Statistics

Canada, 1980)]. The educational level of the participants was higher, however. Seventy-eight percent of the sample had some coursework or diploma beyond high school, compared to 55% of comparably aged women in Ottawa (Census of Canada, 1976).

MDQ Measures

The Menstrual Distress Questionnaire scores together with the biological and psychological attribution ratings were subjected to a multivariate analysis of variance using a 3 × 3 repeated-measures design. Both the Expectancy Group effect and the Time of Testing effect were significant using the 0.10 level of significance recommended by Steven (1980) [$F(6, 90) = 2.87$, $P = 0.013$, and $F(6, 43) = 2.00$, $P = 0.087$, respectively]. The interaction effect was also highly significant [$F(12, 84) = 3.15$, $P = 0.001$].

Fig. 1 presents the mean MDQ scores for each group before and after the manipulation and at the 1-month follow-up. An ANOVA yielded a significant repeated-measures effect ($F(2, 96) = 3.38$, $P < 0.041$] and a signifi-

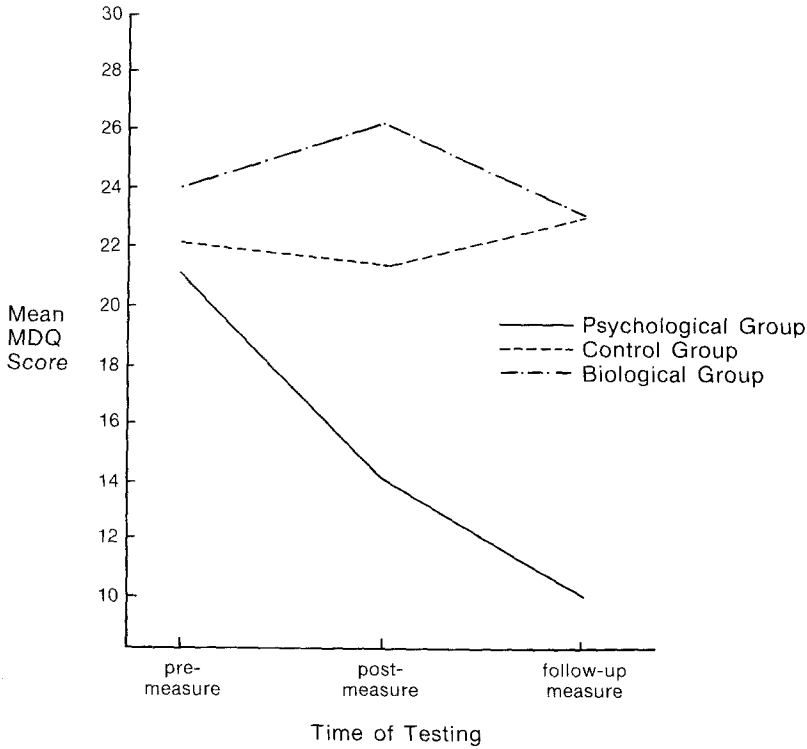

Fig. 1. Mean MDQ scores in each expectancy group for the pre, post, and follow-up assessments.

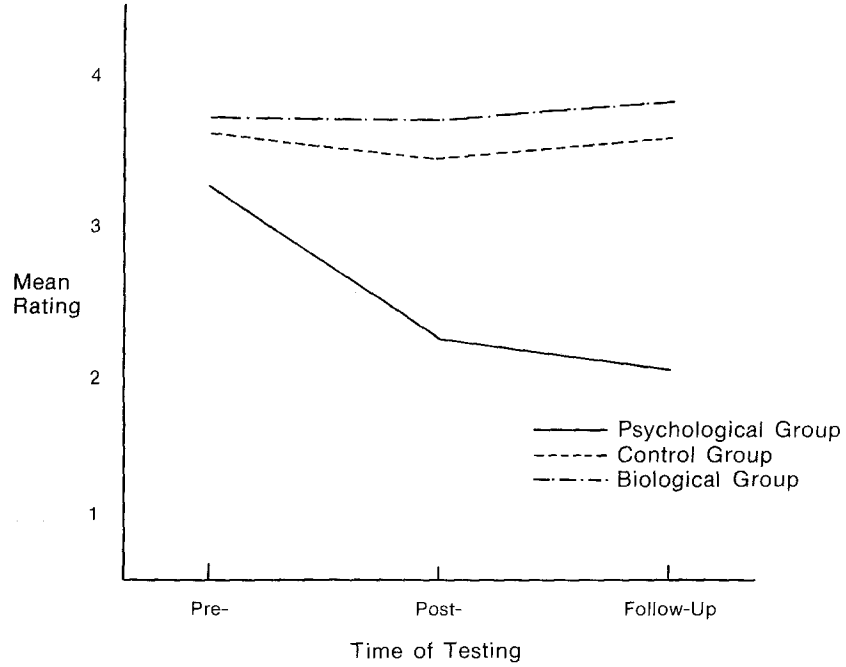

Fig. 2. Mean biological attribution rating for each expectancy group in the pre, post, and follow-up assessments.

cant group × repeated-measures interaction [$F(4, 96) = 4.06$, $P < 0.004$]. Post hoc comparisons using the Newman-Keuls formula revealed that the Psychological group expected and reported actually experiencing fewer symptoms relative to the other two groups and to its own initial level ($P < 0.01$) in all cases), whereas the Biological and Control groups showed no change as a result of time or the information manipulation.

Fig. 2 depicts the mean biological attribution ratings obtained by each group in the pre, post, and follow-up assessments. The ANOVA yielded a significant group × repeated-measures interaction [$F(2, 96) = 3.61$, $P < 0.009$], as well as significant main effects [$F(2, 48) = 7.71$, $P < 0.001$, and $F(2, 96) = 3.42$, $P < 0.04$). Newman-Keuls post hoc comparisons revealed that the Psychological group had lower biological attribution ratings than the other two groups at post- and follow-up testing and their scores at these times were relatively lower than their pre scores ($P < 0.01$). There were no significant differences within or between the other two groups.

Affective, Cognitive, and Behavioral Measures

All dependent measures in the 3 × 2 repeated-measures matrix (Expectancy Group × Cycle Phase) were intercorrelated and grouped into clusters for multivariate analysis based on a minimum correlation of 0.30. By this criterion, the POMS Total Mood Disturbance Scores, the POMS Anger-Hostility subscale, and the Connor's Parent-Teacher Questionnaire ratings on the children were subjected to multivariate analysis together, yielding a highly significant phase effect and a significant interaction [$F(6, 43) = 5.84$, $P = 0.000$, and $F(12, 84) = 1.94$, $P = 0.04$ respectively]. Univariate ANOVA's were therefore performed, followed by Newman-Keuls post hoc comparisons where warranted.

The mean Total Mood Disturbance Score in each condition as rated by the subject herself is presented in Fig. 3. The menstrual phase effect was

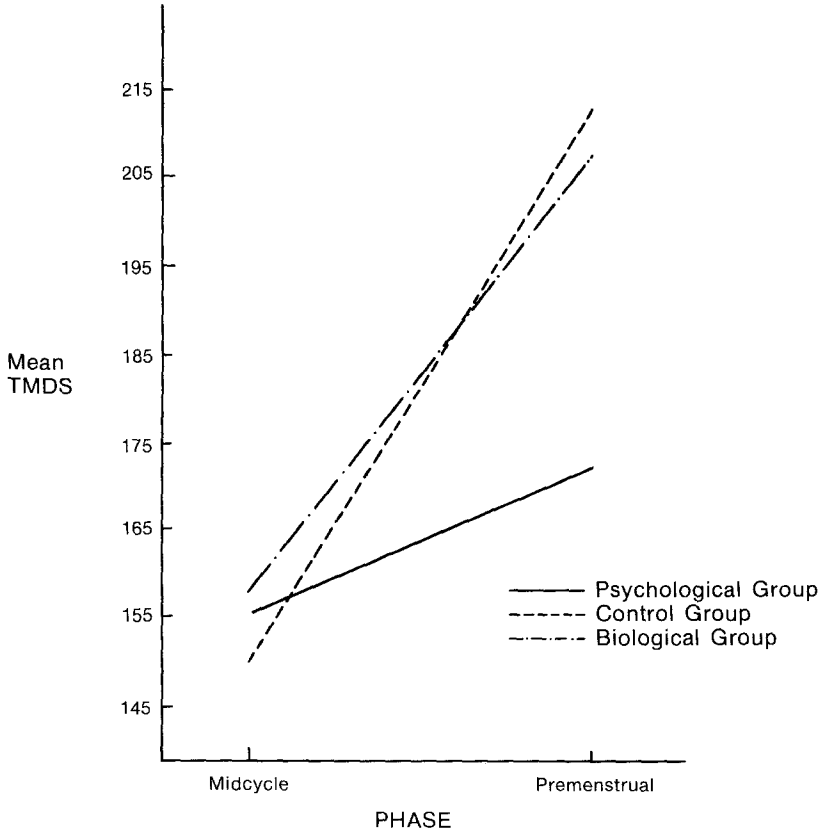

Fig. 3. Mean wife-rated TMDS for each expectancy group at each phase.

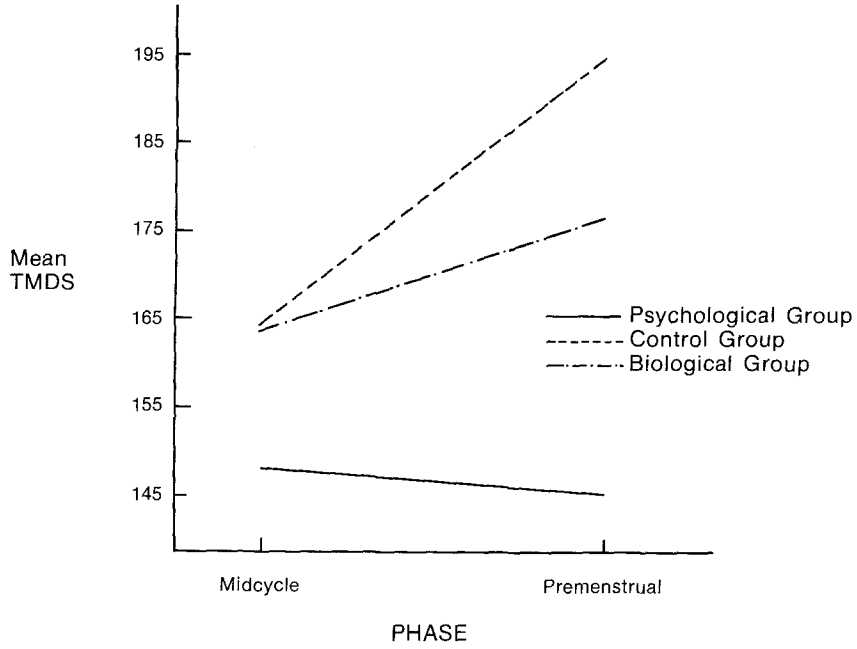

Fig. 4. Mean husband-rated TMDS for each expectancy group at each phase.

highly significant [$F(1, 48) = 30.2$, $P < 0.001$]. In both cases premenstrual negative mood was higher than midcycle. Also, the group × phase interaction of the self-rated scores was marginally significant [$F(2, 48) = 3.02$, $P < 0.06$], and because intergroup comparisons had been planned, the means were compared. It was found that the Total Mood Disturbance Score was significantly higher premenstrually than at midcycle in the Biological and Control groups ($P < 0.01$ in both cases) but not in the Psychological group. Also, the Psychological group had significantly lower premenstrual Total Mood Disturbance Scores than the other two groups ($P < 0.05$ in both cases), which did not differ from each other. Fig. 4 depicts the Total Mood Disturbance Score ratings by the husbands. These revealed only a marginally significant phase effect [$F(4, 18) = 3.64$, $P < 0.06$].

Analysis of the Anger–Hostility POMS scale as rated by both the S and her husband yielded significant phase effects [$F(1, 48) = 23.3$, $P < 0.000$, and $F(1, 48) = 5.99$, $P < 0.02$, respectively]. Anger was higher premenstrually according to both the husband and the wife. Between-group differences did not reach significance. Of all the POMS mood scales, anger showed the greatest increase from midcycle to the premenstrum.

Analysis of variance of the Conners Parent-Teacher Questionnaire (PTQ) scores as rated by the S and her husband revealed no significant differences between phases or groups in the rating of the child's perceived troublesomeness. The correlation between the mothers' and the fathers' PTQ ratings was 0.43 ($P < 0.01$).

The two cognitive measures did not correlate with each other or with any other dependent measures and were therefore subjected to independent univariate analyses of variance. No significant differences were found between groups or menstrual phases in the number of anagrams solved. However, significantly more insoluble puzzles were attempted by all groups during the premenstrual phase than at midcycle [$F(1, 48) = 4.25, p < 0.04$].

Among the behavioral measures, Mother's Positive Interaction and Child's Interaction scores (frequency counts) were positively correlated and therefore subjected to multivariate analysis together, yielding a significant phase effect [$F(2, 47) = 3.30, p < 0.046$]. Subsequent ANOVAs and Newman-Keuls comparisons revealed that women in all expectancy groups demonstrated more positive interaction with their child during the premenstrum than at midcycle [$F(1, 48) = 4.42, p < 0.04$]. There were no significant changes in the Child's Interaction.

Because of the zeros and skewedness of the behavioral data, the Mother's Negative Behavior was log transformed before analysis, and the Child's Negative Behavior and the Mother's Positive vs. Negative Response to the Child's Negative Behavior had to be analyzed by chi-square. None of these analyses yielded significant results.

DISCUSSION

The results suggest that subjects exposed to the psychological explanation of premenstrual tension expected, and reported actually experiencing, fewer premenstrual symptoms during the test month. Additionally, they did not report a significant premenstrual increase in negative affect on the daily mood measure. In the other two groups, symptom complaints remained essentially the same over the study, and women in both groups reported significantly greater negative affect at the premenstrum than at midcycle. Before evaluating the two predictive models concerning the role of expectancy in premenstrual symptoms, two methodological issues must be considered.

First, it seems clear that the expectancy manipulation, although effective in lowering expectancy in the Psychological group, was not effective in raising it in the Biological group. This was probably due to the fact that all the subjects had a strong belief in a biological cause at the outset of the study

as measured by their attribution ratings of the MDQ. Failure to raise expectations means that only half of the experimental proposition can be evaluated.

Second, because subjects were not naive as to the focus of the study, it is possible that they were merely conforming to the experimenter's expectancies as they perceived them, in order to avoid looking naive or neurotic or to please the experimenter. The danger of this effect had been pointed out (Orne, 1962; Rosenthal, 1966; Rosenthal and Rosnow, 1975) and a number of features of the study favor its operation. Subjects were volunteers who invested a great deal of effort, were interested in the study, and tended to identify personally with the experimenter. However, a number of features argue against the "good subject" explanation. First, premenstrual tension was a serious concern and inconvenience to these women and it seems likely that their wish to advance knowledge and derive benefit for their own symptoms would be a stronger motive than pleasing the experimenter. Anecdotally, during the discussion group some subjects in the Psychological group expressed dismay and guilt over the idea that they no longer had the excuse of hormones. Second, the effects of the psychological manipulation were stronger at the end of the test month than immediately following the manipulation. Twelve of the seventeen subjects in the Psychological group reported even fewer symptoms than they had expected. Although only a trend ($p < 0.10$), this shift is suggestive. Third, subjects attempted more puzzles and showed more positive behavior toward their children in the premenstrum rather than displaying the negative premenstrual behavior one might expect of good subjects. Thus, although the good subject phenomenon may have contributed to the expectancy group effect, it is not likely to be a major cause.

The finding that the Psychological group, which had been led to expect fewer symptoms, in fact reported less premenstrual negative affect and fewer symptoms at follow-up supports the synergistic model concerning the relationship between expectancy and arousal. If expectancy is lowered, negative mood is lowered. The stress-reduction model is not supported by the data. Providing women with information on the normal and predictable chemical changes underlying their moods does not seem to mitigate their severity. Nor does removing the normal predictable attributional source enhance the severity of the symptoms.

The mechanism by which expectancy operates to affect moods has not been elaborated in the field of menstrual cycle research or even in the theory of emotion in general. It has been hypothesized to operate at the cognitive–interpretive level, although research has shown that expectancy in other situations can operate at many points along the information-processing chain, from altering sensory thresholds and producing selective attention (Hinde, 1966) to altering physiological states (Frank, 1973). In the present study, the type of psychological information provided to the Ss and the pattern of symp-

tom reduction suggest that deliberate cognitive reappraisal may have played a major role. The manipulation highlighted the ways in which cognitive bias and preconceptions exaggerate the perception and recall of negative moods in the premenstrum and thus provided subjects with a new perspective and concrete strategies for self-analysis. Anecdotal evidence from the discussion group following the videotape suggests that the subjects were attempting to relate the arguments to their own experience. The future drop in symptoms at follow-up, although not statistically significant, suggests that they may have found some validity in the arguments with reference to their own subsequent symptoms.

Most of the menstrual cycle research has focused on the deleterious effects of the premenstrual state. In the present study, two positive changes occurred in the premenstrual phase. First, subjects in all groups persisted longer on the insoluble puzzle during the premenstrum than at midcycle. Rodin (1976) found that women who could reattribute their task arousal to their menstrual state performed better on a variety of tasks including insoluble puzzles. She proposed that the difference was due either to a greater effort or to the stress-reducing potential of the reattributional process. If either of these factors were operating, the Psychological group ought to have persisted less than the other two groups in the present study. However, no significant differences were found between groups. The failure to replicate Rodin's findings may be due to a number of differences between the two studies in the way the tasks were measured. The present study included the presence of added distractions which increased the error variance. Perhaps of more importance is the fact that Rodin used menstruating women as opposed to premenstrual subjects.

The second interesting finding was that mothers engaged in more positive interaction with their children during the premenstrum than at midcycle. This is consistent with Herlihy's (1977) report that physical affection peaked at the premenstrum in her sample of preschool teachers. Although provocative, these results in the present study must be interpreted cautiously, as methodological bias inherent in a laboratory observation with informed subjects favors their exhibiting positive behavior, particularly if they are on guard against negative behavior, as they might be during the premenstrum. This same methodological bias may have contributed to the failure to find the predicted increase in premenstrual negative behavior. Anecdotally, the subjects often voiced their concern about their irritability and excessive punitiveness toward their children during the premenstrum.

Besides not finding a premenstrual increase in negative maternal behavior, the study found that premenstrual mothers did not perceive their children as more problematic. In fact, in the sample as a whole, correlations between mother's mood and child's troublesomeness were weaker at the

premenstrum, suggesting that the mothers did not confound their moods with their children's, premenstrually. As an important point for future research, however, in the Control group there was a strong positive correlation ($r = 0.62$, $P < 0.01$) between the mother's ratings of her mood and her child's troublesomeness in the premenstrum, suggesting that control subjects did confound their moods with their children's. Mood–troublesomeness correlations were negative or nonsignificant in the two experimental groups. The Control subjects lacked the information and the group discussions which may have helped the other women appraise themselves more objectively.

The present study's investigation of expectancy and maternal behavior by experimental means provides some initial data and some direction for therapeutic and theoretical development. Future research might aim at clarifying the type of information and the means of information transmission which are most effective in reducing premenstrual distress.

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